**3GPP TSG-RAN** **WG2 Meeting #110-e R2-200xxxx**

**Electronic, June 1 – 12, 2020**

**Source: Qualcomm Incorporated**

**Title: Summary of email discussion [AT110e][017][NR15] UE cap Simultaneous SRS antenna and carrier switching**

**Document for: Decision**

**Agenda Item: 5.4.3.1**

# Introduction

This document summarizes the following email discussion.

* [AT110e][017][NR15] UE cap Simultaneous SRS antenna and carrier switching (Qualcomm)

Scope: Treat [R2-2004434](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004434.zip), [R2-2004435](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004435.zip), [R2-2005360](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005360.zip), [R2-2005361](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005361.zip), [R2-2004971](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004971.zip), [R2-2005579](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005579.zip), [R2-2005580](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005580.zip) (proponents are responsible to explain and drive)

Part 1: Decision whether to make corrections or not, identify agreeable corrections. Deadline: June 4, 0700 UTC.

Part 2: For agreeable parts, continuation to agree CRs. Deadline: June 10, 0700 UTC

# Discussion: Part 1 (by June 4, 0700 UTC)

The issue of SRS antenna switching capability during SRS carrier is switched to SRS only SCell was discussed in RAN2#109bis-e.

## Solution for NR

In this meeting, two solutions were submitted.

Solution 1: Reuse the LTE solution ([R2-2004434](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004434.zip), [R2-2005360](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005360.zip); Qualcomm Incorporated)

Solution 2: Allow the UE to signal SRS antenna switching capability for a band where *FeatureSetUplinkId* set to 0 ([R2-2004971](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004971.zip), [R2-2005579](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005579.zip), [R2-2005580](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005580.zip), Huawei et al.)

Companies are requested to indicate if they agree to any of the solutions above.

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| **Company name** | **Agree / Disagree to**  **Solution 1 / 2** | **Comments** |
| Qualcomm Incorporated | Solution 2 | The solution 2 is indeed simpler and better than the solution implemented in LTE. We are ready to withdraw solution 1. |
| Huawei | Solution 2 | Proponent. We think this solution is simpler and would not require extra complexity from the NW side to identify two associated BCs. |
| CATT | Solution 2 | Agree with the above comments that solution 2 is simpler. |
| vivo | Solution 2 | The solution 2 is simpler and clearer than the solution 1. |
| ZTE | Solution 2 | We agree that the solution 2 is simple. The solution 2 may have some limitation to the UE RF as our paper [R2-2004971](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004971.zip) analyzed. Anyway, if the solution 2 could be accepted by UE vendors, it’s also OK for us. |
| Apple | See comments | Before selecting solution, we would like to clarify one thing. From the ASN.1, it is seen UE can report a list of source bands (from which the SRS carrier switch is performed), and UE only reports one set of SRS antenna switch capability (inlcuidng supportedSRS-TxPortSwitch and txSwitchImpactToRx, txSwitchWithAnotherBand) for the particular target band. We are wondering how could UE properly report the SRS antenna switch capabilty set to the target band, since different source bands have different capabilities on SRS antenna switch.  For example, for a BC A+B+C, both A and B can operate as source band. For target band C which has no UL feature set, how would UE indicate the SRS antenna switch capability? Please note that UE should indicate three kinds of UE capability: supportedSRS-TxPortSwitch and txSwitchImpactToRx, txSwitchWithAnotherBand. From an initial thinking, my understanding is the last two parameters may be not relevant to source band, since the extra RF chain is now dedicated to the target band and may be not coupled with other bands in the target BC when performing SRS antenna switch. But I am not 100% sure.  However, the supportedSRS-TxPortSwitch should be largely dependent to the UE capability on source band. That is to say, dependent to which band (A or B) is the source band, supportedSRS-TxPorstSwitch capability on band C should be different.  Then how solution 2 handles this? |
| Ericsson | Solution 2 | Similar view as Huawei. |
| Samsung | Solution 2 | Both would work but solution 2 is more intuitive and simpler. |
| MediaTek | Solution 2 | Agree solution 2 is intuitive and simpler. |
| OPPO | Solution 1 | We think solution 2 is not feasible. Here is one example: assuming we have band combination with 3 band (A,B,C) where band A and B has uplink carrier while band C doesn’t. For carrier switch operation there are two cases:  Case 1: uplink of band A switch to band C  Case 2: uplink of band B switch to band C  In case 1,if IE *txSwitchImpactToRx* or *txSwitchWithAnotherBand* is present for band C, then it should be entry number of B i.e. one  In case 2, it should be entry number of A i.e. zero  So the example shows content of UE capability of band C after switching could be different and depends on which band is switched. But follow option2, there could be only one possibility. So how could it be feasible? |

## Clarification for LTE ([R2-2004435](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004435.zip), [R2-2005361](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005361.zip))

Based on the company comments seen in RAN2#109bis-e meeting, clarification to LTE specification is proposed ([R2-2004435](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2004435.zip), [R2-2005361](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005361.zip); Qualcomm Incorporated). The intention is to clarify how the target band combination where the antenna switching capability is applicable during SRS carrier is switched can be identified.

Companies are requested to indicate if they agree to the CRs.

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| **Company name** | **Agree / Disagree** | **Comments** |
| Qualcomm Incorporated | Agree (proponent) | For LTE, we should stick to the current solution and clarification should be done on top of it. |
| Huawei | Agree | Yes this is our understanding and the clarification could help consistent understanding between the UE and the NW. |
| CATT | Agree |  |
| vivo | Agree | For LTE, the current solution needs this clarification for common understanding between the UE and the network. |
| ZTE | Agree | Yes, we think this clarification is needed. |
| Apple | Agree |  |
| Ericsson | Agree | We think the clarification is beneficial |
| Samsung | Agree | We agree that this clarification is needed. |
| MediaTek | Agree |  |
| OPPO | Agree with comment | Following this additional condition, actually what should be derived is per band per BC UE capability of by in the example. And if this condition is not met, then the derivation is not valid. So maybe we can make it clearer:  “…the antenna switching capability of by can be derived based on band combination Ctarget = {b1(1),…,bx(0),…,by(1),…},” |

# Discussion: Part 2 (by June 10, 0700 UTC)

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# Conclusion

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# Reference

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